

**A DISSERTATION ON
THE PROGNOSTIC OUTCOME OF CERVICAL
SPONDYLOSIS FOLLOWING CERVICAL TRACTION
AS PHYSICAL MODALITY**

**In partial fulfillment of the
Regulations for the award of the degree of**

MD PHYSICAL MEDICINE & REHABILITATION



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Acknowledgement

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I extend my thanks to my family and friends who have stood by me during my times of need. Their help and support have been invaluable to the study.

Finally I thank all the patients who form the most integral part of the work despite their pain and sufferings were kind and co-operative. I was happy with their recovery and place this study as a tribute to them.

CONTENTS

1	TITLE PAGE	
2	ACKNOWLEDGEMENT	
3	ABBREVIATIONS AND ACRONYMS	
4	INTRODUCTION	1
5	REVIEW OF LITERATURE	3
6	AIM OF STUDY	27
7	MATERIALS AND METHODS	28
8	OBSERVATION AND RESULTS	36
9	DISCUSSION	57
10	CONCLUSION	61
11	SUMMARY	62
12	BIBLIOGRAPHY	64

ANNEXURE I – CASE PROFORMA

ANNEXURE II – MASTER CHART

Abbreviations and Acronyms

Abbreviations and Acronyms

ROM	Range of Motion
M	Male
F	Female
VAS	Visual Analog Scale
C Spine	Cervical Spine
RT	Right Side
LT	Left Side
NSAIDS	Non Steroidal Anti Inflammatory Drugs
ESR	Erythrocyte Sedimentation Rate
TC	Total Count
DC	Differential Count
AP	Anteroposterior
LAT	Lateral

Introduction

Introduction

Cervical Spondylosis is the degenerative condition of the cervical spine is the commonest neck problem seen in out patient clinics of all total cervical problems.

It's Prevalence and Incidence is as early as after 30 years of age in both sex and proceed further as age advances according to the vocational aspect, prolonged bad postures in a sedentary life style.

It produces various symptoms ranging from neck pain (localized and radiating), restriction of neck movements, weakness in muscle power, sensory deficit, numbness and tingling sensation in the upper limbs, giddiness, sometimes difficulty in walking and balance due to spinal cord involvement.

Cervical traction is one of the physical modality used in the treatment of cervical spondylosis is often argued as worthless and unproven. Some tend to use cervical traction in all cervical conditions indiscriminately, need to be reminded that specific contradictions for cervical tractions do exist. Above

all the primary reason for not using cervical traction is lack of expertise on the part of person prescribing it or applying it.

Cervical Spine is the most flexible part of the spine in the human beings.

It undergoes more movements in C5-6 Interspace followed by C4-5 and C6-7 Interspace.

The objective of the study is to evaluate subjects suffering from cervical spondylosis after careful selection and applying cervical traction and assess the outcome of study in pain relief, radiation of pain and range of motion.

Review of Literature

Cervical Spondylosis

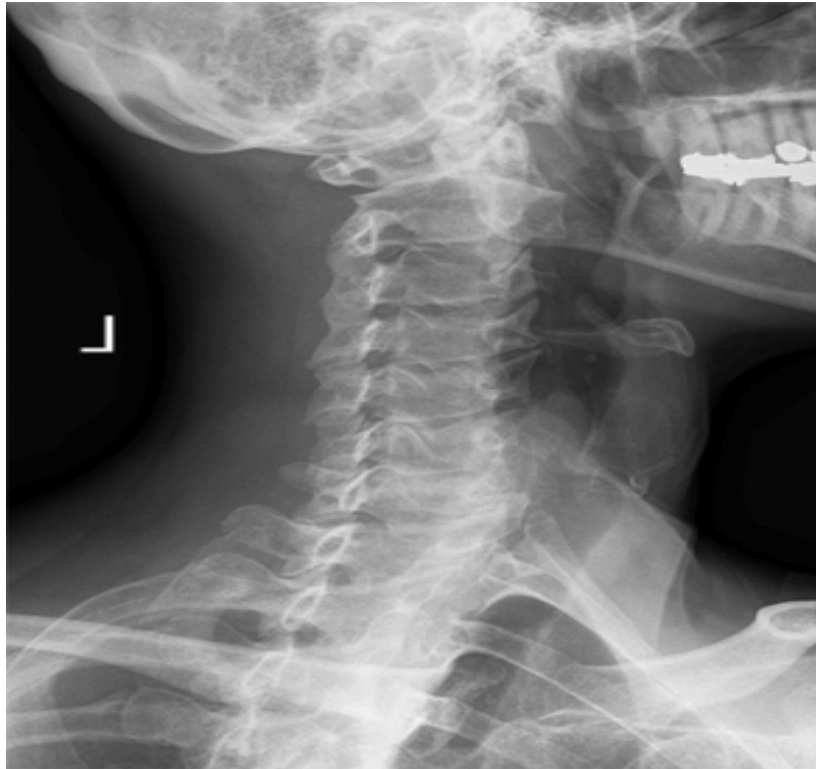
Cervical Spondylosis is the most commonest condition affecting the neck involving cervical spine. The degenerative changes appear early in life during the third decade. Water desiccation from the disc space reduces the height of the disc along with the facet joints and the uncovertebral joints degeneration. There is inevitable restriction of movements at the affected level. The early clinical picture includes morning neck pain and stiffness that tend to improve during the day, also late evening neck fatigue. There is usually loss of neck range of movements at the extremes of movement. Extension of the neck tends to be affected first, then side bending. Some patients can feel or hear crepitation noise on neck movement. The condition may produce symptoms, triggered off by minor trauma or even without it. According to the level of affection pain may be felt in the centre of the neck due to muscle spasm, may radiate to the occipital region producing severe occipital headache. It may also radiate to the lower scapular region, often there is pain at the side of the neck and at the region of supraclavicular area. With the nerve root involvement from arthritic changes in the facet or uncovertebral joints and from disc bulge there may be radiation of pain into the shoulders, arm and hand with paraesthesia, sometimes demonstrable

neurological involvement which may include absent upper limb reflexes, muscle weakness and sensory deficit, in the dermatome pattern. As age advances more wear and tear produce big osteophytes posteriorly may along with disc bulge produce long tract signs and disturbance of gait. Vertebral artery involvement by osteophytic overgrowth may cause giddiness mostly by sudden movement of neck especially extension. The formation of big anterior osteophyte may sometimes cause dysphagia.

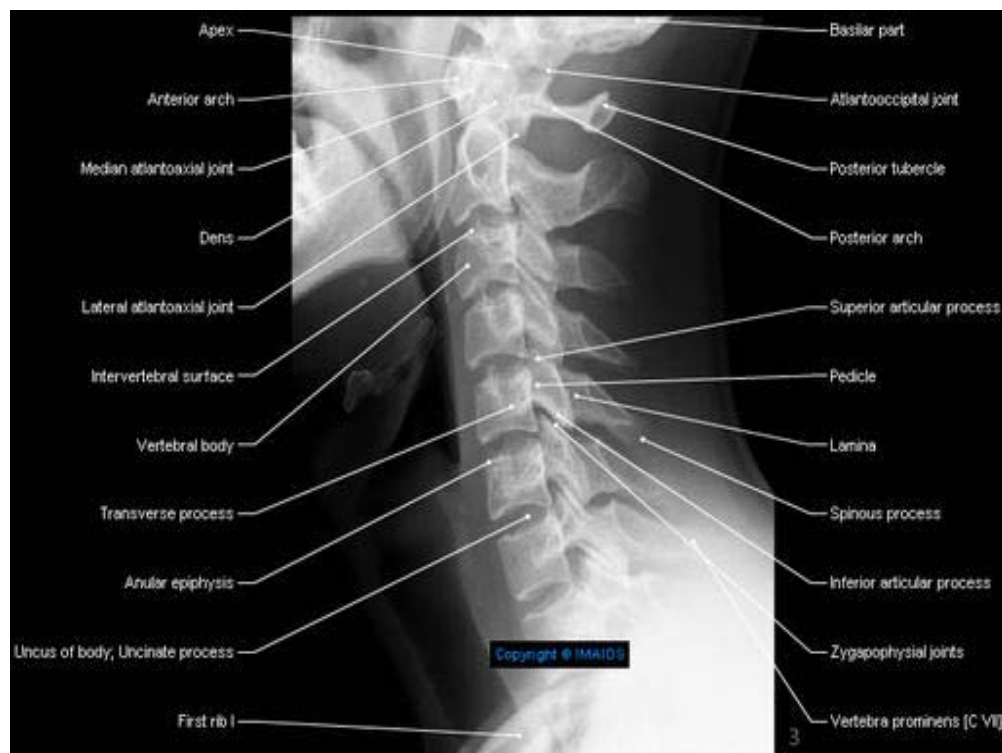
Diagnosis of the Cervical Spondylosis

Inclusive Studies

It is derived from the history of present illness, past illness, vocational history. Physical examination of the range of movements of the neck (active and passive), examination of the muscle for spasm, neurological examinations involving testing for muscle power and sensory testing in dermatome pattern, superficial and Deep reflexes to diagnose clinically.



X-ray c.spine oblique view



X-ray c.spine lateral view

Lab Studies

It include X-ray studies of cervical spine of Anteroposterior, lateral, oblique views which clearly shows presence of reduced joint space, osteophytes presence and oblique view shows clear foraminal encroachment.

Exclusive Studies

1. Blood investigations of TC, DC, ESR, C-reactive protein to rule out infections., and acute inflammatory conditions.
2. CT Scan to demonstrate spinal canal encroachment in a suspected cases due to osteophytes.
3. Myelography for Nerve root impingement
4. MRI Studies to rule out disc prolapse and other soft tissue lesion

During treatment of cervical spondylosis in acute stages various treatment are used including using NSAIDS, Narcotic analgesics, Muscle Relaxants, Physical therapies such as superficial heat, cervical traction, exercise therapy and soft cervical collar can also be used.

The general goals of treatment are to reduce pain, reduce inflammation and preserve and improve cervical ROM.

It is also advised to avoid holding head in any position for a protracted period of time especially extension.

Avoid high Impact Exercise such as running, Impact aerobics and other exercises involving jumping or bouncing are avoid.

Maintain Range of movement exercises.

Avoid prolonged extension of neck.

Anatomy of the Cervical Spine, Ligaments, Muscles around it and Biomechanics of the Cervical Spine

It contains seven vertebrae's. The first two being completely different from the rest. The first Atlas don't have the body of the vertebra, but have two lateral mass with a superior and inferior articular facet which are connected by the anterior and posterior arch. This superior articular facet articulate with the lower aspect of occipital condyle. The lower articular facet of the atlas articulate with the superior articular facet of the Axis. The body of the axis in the upper part have a upright bony mass called Dens which articulate with the articular facet of Dens in the anterior arch. The other five cervical

vertebrae C3 to C7 show the general vertebral features, but the cervical vertebrae are easily distinguishable by the presence of foramina in their transverse processes, which conduct the vertebral artery, except in the case of seventh vertebrae which transmit the vertebral veins and nerves. The vertebral bodies size increase from up downwards antero posteriorly. They have the pedicle and lamina which fuse to form the bifid spine and transverse process posteriorly. The superior articular facet of the lower vertebra and the lower articular facet of the upper vertebra unite to form the zygoapophyseal joints which are lined by synovial membrane. The spinous process of all cervical vertebrae are bifid except the seventh which is longer and prominent is called vertebrae prominens. The cervical vertebrae foramina are comparatively large in order accommodate spinal nerves. It is bounded by bodies, intervertebral disc, pedicle, lamina of the vertebrae. Projecting laterally from the junction of the pedicle and lamina are superior and inferior articular facets. There are discs between C2 to C7 vertebral bodies.

Ligaments

These both vertebrae and disc spaces are connected by various ligaments.

Anterior longitudinal ligament

Posterior longitudinal ligament

Ligamentum flavum

Ligamentum nuchae

Intertransverse ligaments

Anterior atlantooccipital membrane

Posterior atlantooccipital membrane

Anterior longitudinal ligament

The Anterior longitudinal ligament extends from the base of the skull to the sacrum. The uppermost part reinforces the anterior atlantooccipital membrane in the midline. The part between the anterior tubercle of the atlas and the anterior median ridge of the axis may have lateral extensions (the atlantoaxial ligaments).

Posterior longitudinal ligament

The ligaments on the posterior aspects of vertebral bodies contribute added strength to the craniocervical region and some are especially arranged to check excessive movements such as rotation at the median and lateral

atlantoaxial joints. The broad, strong tectorial membrane lies within the vertebral ligaments. It prolongs the posterior longitudinal ligaments upwards from the posterior surface of the body of the axis to the anterior and antero lateral margins of the foramen magnum where it blends with the duramater. It covers the Dens and its ligaments and gives added protection to the junctional area between the medulla oblongata and spinal cord. The median atlantoaxial joint lies between the dens of the axis and the ring formed by the anterior arch and transverse ligament of the atlas. The transverse ligament of the atlas is the strong band passing horizontally behind the Dens and attached on each side to a tubercle on the medial side of the lateral mass of the atlas. Attached with the transverse ligament lies the superior longitudinal fascicles, with its base to the broad transverse ligament extend up to the basilar part of the occipital bone. Inferior longitudinal fascicles extend from the transverse ligament to the body of the axis. Together with the transverse ligaments they form the cruciform ligaments. The apical ligament is a slender cord connecting the apex of the Dens to the anterior midpoint of the foramen magnum, lying between the anterior atlantooccipital membrane and the upper limb of the cruciform ligament. The Alar ligaments are two fibrous bands stretching upward and outwards

from the supralateral aspects of the dens to the medial side of the occipital condyle. They check excessive rotation at the median atlantooccipital joint.

Ligamentum flavum

Ligamentum flavum contain a high proportion of yellow elastic fibres and connect the laminae of adjacent vertebrae. They are present between the posterior arch of the atlas and the laminae of the axis but absent between atlas and skull.

Ligamentum nuchae

Ligamentum nuchae is a dense fibro elastic membrane stretching from the external occipital protuberance and to the crest of the posterior tubercle of the atlas and the spinous processes of all other cervical vertebrae.

Intertransverse ligaments

Intertransverse ligaments extend between transverse process of the cervical vertebrae.

Anterior atlantooccipital membrane

Anterior atlantooccipital membrane is a wide dense fibro elastic band extending between the anterior margin of the foramen magnum and the upper border of the anterior arch of the atlas. Laterally it is continuous with the articular capsules of the atlantoaxial joints. In the midline it is reinforced by the upward continuation of the anterior longitudinal ligament.

Posterior atlantooccipital membrane

Posterior atlantooccipital membrane is broader and thinner than the anterior and connects the posterior margin of the foramen magnum with the upper border of the posterior arch of the atlas. On each side it arches over the groove for the vertebral artery leaving an opening for the first cervical nerve also.

Inter Vertebral Discs

Inter vertebral discs are interposed between the adjacent vertebral bodies from the axis to the sacrum. They are immensely strong fibro cartilaginous

structures that provide powerful bonds and elastic buffers. They consist of an outer concentric layer of fibrous tissue, the annulus fibrosus (the fibres in adjacent layers are arranged obliquely but in opposite directions) to assist in resisting torsion. It contains a central springy, pulpy zone, the nucleus pulposus.

Articular capsules

Articular capsules surround the joints between the occipital condyles and the superior articular facets. The capsules are loose allowing nodding movements of the head. They are thin medially, laterally they are thickened to form the lateral atlantooccipital ligaments which limit lateral tilting of the head.

Lateral atlantoaxial joints are formed between the almost flat inferior articular facets on the lateral mass of the atlas and the superior articular facets of the axis. They are synovial joints within loose articular capsules. There are two small synovial cavities surrounded by these articular capsules between the dens and the anterior arch of the atlas in front and the transverse ligaments of the atlas behind. The zygoapophyseal joints between

second to seventh cervical vertebrae also have loose capsule with synovial lining.

Muscles of Neck

Trapezius arises from the medial third of the superior nuchal line, the external occipital protuberance, the ligamentum nuchae and the spines of the cervical and all thoracic vertebrae. The upper fibres sweep downwards to the lateral third of the clavicle. The middle fibres run horizontally to the medial edge of the acromion and the adjacent part of the superior margin of the crest of the spine of scapula. The lower fibres ascend to a small, flat tendon which end on the medial part of the upper margin of the crest.

Levator Scapulae

It arises from each of the transverse process of the upper four cervical vertebrae. The muscle descend as two or more slips to be inserted into the medial border of the scapula from the upper angle to the spine.

Splenius muscle

Splenius muscle arise from the lower part of Ligamentum nuchae and the spines of the seventh cervical and upper six thoracic vertebrae. The lower part splenius cervicis run to the back of the transverse processes of the upper two or three cervical vertebrae deep to levator scapulae. The larger upper part splenius capitis is inserted into the lower part of the mastoid process and the lateral part of the superior nuchal line deep to sternocleidomastoid.

Erector Spinae

The major part of this muscle begins in sacrum ascend into cervical region. The semi spinalis arises from the thoracic transverse process and are inserted into the thoracic spines (semi spinalis thoracis) into the cervical spines (semi spinalis cervicis). Still deep are transverse spine muscles, multifidus, rotatores, Inter spinalis and Intertransversari.

Longissimus Capitis

This slender muscle arise from the upper thoracic transverse process ascend to the back of Mastoid process under cover of splenius and sterno cleidomastoid. **Longissimus cervicis** lies under **Longissimus capitis** has the same origin, but inserts into the posterior surfaces of the cervical transverse process except the first.

Semi spinalis capitis

It lies deep to Trapezius and splenius. It has the same origin as Longissimus capitis and is inserted into the medial half the area between superior and inferior nuchal lines.

Semi spinalis cervicis

It has the same origin as semi spinalis capitis and it passes supra medially to the spines of the second to fifth cervical vertebrae, mainly in second cervical spine.

Sub occipital muscles

Rectus Capitis Posterior Major

It passes supra laterally from the spine of the axis to the lateral half of the area below inferior nuchal line of the occiput.

Obliques Capitis Inferior

It passes from the spine of the axis to the transverse process of the atlas

Obliques Capitis Superior

It runs postero superiorly from the transverse process of the atlas to the lateral half of the area between the nuchal lines.

Rectus Capitis Posterior Minor

It passes from the tubercle of the posterior arch of the atlas to the medial part of the area below the inferior nuchal line under cover of the rectus major.

Anterior and side muscles

Sterno Cleido mastoid

It has two heads. A tendinous sternal head arise from the upper part of the anterior surface of Manubrium sterni and by a thin fleshy clavicular head from the upper surface of the medial third of the clavicle. They ascend up fuse with the other in the middle of the neck. The thick anterior border is inserted into anterior surface of the Mastoid process while the posterior part becoming thin is attached to the lateral surface of the mastoid process and the lateral half of the superior nuchal line.

Scalene Muscles

Scalenus anterior

It arise from the anterior tubercles of the transverse process of the third to sixth cervical vertebrae and is inserted to the scleue tubercle on the first rib.

Scalenus Medius

It arise from the post tubercles of all the cervical transverse processes and is inserted into a rough oval area in the superior surface of the first rib.

Scalenus Posterior

It is a small muscle which is really part of scalenus Medius is inserted into the external surface of the second rib.

The Prevertebral Muscle

Longus colli is the most medial of the muscles. It extends from the anterior tubercle of the atlas to the third thoracic vertebrae. It is attached to the bodies of the intervening vertebrae and to the transverse process of the third to sixth cervical vertebrae.

Longus capitis is lying anterolateral to Longus colli. It passes from the anterior tubercles of the third to sixth cervical transverse processes to the base of the skull in front of the rectus capitis anterior.

Rectus Capitis Anterior

Rectus capitis anterior passes from the anterior surface of the lateral mass of the atlas to the base of the skull, immediately anterior to the occipital condyle.

Rectus capitis lateralis passes from the superior surface of the transverse process of the atlas to the jugular process of the occipital bone.

Neural Structures

The spinal canal has twice the room in the transverse diameter than in the antero posterior diameter. It is widest in C3-5 and then rapidly reduce in size downwards. From the spinal cord arises ventral motor and dorsal sensory roots unit to form the spinal nerves. The cervical nerves run over the upper border of the pedicles and slop laterally and anteroinferiorly along the transverse process, exit through the root canals dividing into anterior and posterior rami. The anterior rami supply the prevertebral and paravertebral muscles and form the brachial plexus to provide innervations for the upper limbs. The posterior rami divides into muscular, cutaneous and articular

branches for the posterior neck structures including posterior vertebral muscles.

The cervical intervertebral disc receive nerve supply anteriorly from the vertebral nerves which accompany vertebral artery. The postero lateral innervation is from the sinuvertebral nerve formed from the branch of the vertebral nerve and ventral ramus at each level. It also supplies the posterior segment of the disc, posterior longitudinal ligament, pedicle, posterior vertebral periosteum, epidural veins and dorsal duramater. The cervical zygoapophyseal joints are innervated by the medial branches of the posterior cervical rami C3-7, the third dorsal ramus (third occipital nerve), innervate C2-3 joints. The atlantooccipital and atlantoaxial joints are supplied by C1 and C2 ventral rami.

Bio Mechanics of the Cervical Spine

The atlanto occipital joint permits 10° flexion and 25° extension

The greater amount of rotation is seen in the cervical spine occur at C1 and C2 joint with 45° rotation in either direction.

Then cervical zygoapophysial joints are more concave when compared to thoraco lumbar spine which are convex.

Cervical facet orientation is at 45° compared to thoracic which is in 60° and to lumbar in 90°

At and below C2-3 junction more flexion happens. There is approximately 10° flexion per segment C5-6 interspace undergoing greatest movement followed by C4-5 and C6-7 interspaces.

The lower cervical vertebrae C3-7 have unique articulation called uncovertebral joints or as joints of Luschka. They arise from the posterolateral margins of the vertebral bodies and lie anterior to exiting nerve roots. These articulations can degenerate with association to disc degeneration can lead to encroachment of the intervertebral canal causing nerve root even spinal cord compression.

Ligaments, joints, capsules resist excess movement between C1 and C2

The intervertebral disc provides shock absorption and separate vertebral bodies to give height to the intervertebral foramina.

The several ligaments found at each vertebral level give strength and stability to cervical spine in various movements.

Posterior annulus of the disc is reinforced by the posterior longitudinal ligament.

The ligamentum nuchae which spans from occiput to C7 spinous process add support to the posterior of the neck.

The neck muscles give support and provide movement for the cervical spine and the head. The long superficial posterior group muscle causes extension whereas short deep muscles cause rotation also when working ipsilaterally. The anteriorly placed scalene and sternocleidomastoid muscles are important flexors and additional rotators of the neck and head.

Some extrinsic muscles such as trapezius, levator scapulae have attachments to cervical spines

Cervical Traction

Cervical Traction is the act of drawing or pulling or a pulling force that is applied to the cervical spine with the hope of relieving pain in or originating from those areas. It causes elongation of all soft structures in variable degrees, it opens the intervertebral foramen, probably cause a suction effect on the disc (by cyriax).

There are many ways of applying it

Manual Traction

It is a method applying traction to the cervical spine by the doctor or physiotherapist physically to assess whether mechanical, motorized cervical traction will be useful or not.

Mechanical Traction

It is a method where pull generated by a free weight and pulley system is applied to head by a harness. There are two types, 1. Sitting position traction where more weight is required to counter balance the head. 2. Supine lying traction where a few pound of weight is enough to overcome the friction.

Motorized Traction

It is a mechanical method particularly for the cervical spine provides continuous or intermittent application of a reproducible force.

Positioning of head during Cervical Traction

20 to 30° of neck flexion is found to be effective in the cervical spine traction was supposed to widen the intervertebral foramina

Duration of Session

20 minutes if tolerated by the patient seems to be most commonly prescribed.

Weight used in Cervical Traction

Normally it is suggested that 10% of total body weight should be used as a guide line initially later raised to tolerance for effective intermittent cervical traction 10-35 pounds can be used.

Traction Timing in Intermittent Cervical Traction

Various time settings were tried and 7 second traction pull on and a 5 second traction off seems to be the best.

Frequency and duration of treatment course

3 to 4 times weekly for 3 to 4 weeks

In between guide lines are given to discontinue traction trials if not effective after 4 to 6 session and also if it aggravate the symptoms it should be stopped immediately.

Aim of Study

Aim of the study

To find out the effectiveness of the cervical traction as a physical modality.

To compare the outcome of VAS, ROM of the neck and radiation of pain after three weeks of cervical traction of the study group with a control group.

To study the association of Age, Sex, Radiation of pain to which side with cervical Spondylosis in the study.

Materials and Methods

Setting

The study was conducted on subjects with cervical spondylosis, attending as outpatients.

Design of study

The study was a cross sectional case-control analytical study

Period of study

The study was conducted from June 2010 to January 2011

Consent

Informed consent was obtained from the subjects studied

Inclusion Criteria

Individuals who were diagnosed as cervical spondylosis attending for treatment in the outpatient department were included in the study if they met the following inclusion criteria

- Diagnosis of cervical spondylosis after 30 years of age
- Repeated attacks of neck pain with the history of previous episodes were also included

- Absence of muscle weakness and sensory deficits and reflex deficit are included
- Patient with left side radiating pain without ECG changes for heart problem were included
- Patient with diagnosis of cervical spondylosis without long tract signs were included
- Age within 65 were included

Exclusion Criteria

- Those patients with rheumatoid features, acute infective features, tumor like features
- Patients with cervical vertebrae abnormality like block vertebrae, old fracture in cervical spine.
- Patients with cervical spondylotic myelopathy
- Patients with severe cardiac illness, severe hypertension, severe pulmonary problems
- Age above 60 were not included

Subjects

Thus a total of 20 case that satisfied the Inclusion and Exclusion Criteria stated above were taken up for the study with NSAIDS and Hotpack and cervical traction. 5 patients with cervical spondylosis were given NSAIDS and hotpacks only, 5 patients were given only NSAIDS, served as positive control to provide corroborative evidence of the strength of association and to eliminate selection bias.

Controls

Ten (six male and four female) age and sex matched patients treated with cervical spondylosis were recruited as controls.

Study Protocols

Patient attending as out patients in my clinic were the study group. A well designed proforma was used to collect the demographic and clinical details of the patients

Collaborating Departments

Private labs for Blood Investigation and

X-ray study

Physiotherapist with my motorized cervical traction unit

Methods

Selected socio demographic, clinical and laboratory data were collected from both the cases and controls were recorded in a proforma.

Socio demographic data comprised of

Age :

Sex :

Locality :

Occupation :

Clinical data comprised of

History of present illness with duration

History of past illness

Physical examination of the range of movements of the neck (active and passive), muscle spasm

Neurological examinations involving

Testing

Tone

Muscle power

Sensory system

Reflexes Superficial

Deep

Laboratory data included

Urine – albumin, sugar, deposit

Blood – Hb%

Blood – TC, DC, ESR

C reactive proteins

ECG

Imaging Studies

X-ray C- Spine

AP view

LAT view

Oblique View

CT scan

MRI Scan

30 patients among the outpatients attending physiotherapy were subjected to detailed history, physical examination and neurological examination. Cervical Spondylosis were diagnosed based on combination of symptoms, x-ray findings of the cervical spine in the anteroposterior, lateral and oblique views. Blood test with Hb%, ESR, C reactive proteins are performed to find out rheumatological, infective and tumour causes

Cervical Traction

The most widely used physical modality in the treatment of cervical Spondylosis and estimating the prognosis involves recording the range of movements of the neck, in flexion, extension, side rotation and lateral flexion and recording the visual analog scale (VAS) as a subjective pain measurement, radiation of pain to which side are recorded before and are reassessed after three weeks of treatment were also recorded.

Of the two methods of cervical traction in my study intermittent traction with more weight is used. Traction was given in supinelying position with 25° of neck flexion to bring about the maximum result (using a pillow).

The weight initially used in traction is based on the guidelines of 10% of the total body weight and rise upto tolerable limit of 9Kg was used in my study. The traction time was 20minutes a session. The traction timing was 20seconds ON and 5seconds OFF. The traction was given on alternate day. 10 sessions were given.

Conflict of Interest

There was no conflict of interest.

Financial Support

NIL

Statistical Analysis

The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using **Epidemiological Information Package (EPI 2010)** developed by Centre for Disease Control, Atlanta.

Using this software range, frequencies, percentages, means, standard deviations, chi square and 'p' values were calculated. Kruskal Wallis chi-square test was used to test the significance of difference between quantitative variables. A 'p' value less than 0.05 is taken to denote significant relationship.

Observation and Results

Group A : Patients given hot pack, NSAIDS and cervical traction

Group B : Patients given hot packs and NSAIDS

Group C : Patients given NSAIDS

A : PROFILE OF CASES STUDIED

Table 1 : Age Distribution

Parameter	Age in years		
	Group A	Group B	Group C
Range	38-60	39-56	38-52
Mean	47.9	48.2	45.6
S.D	5.9	6.1	5.4
p	0.7154 Not Significant		

The mean age of the patients in all three groups is similar. The difference is not statistically significant p 0.7154.

AGE DISTRIBUTION

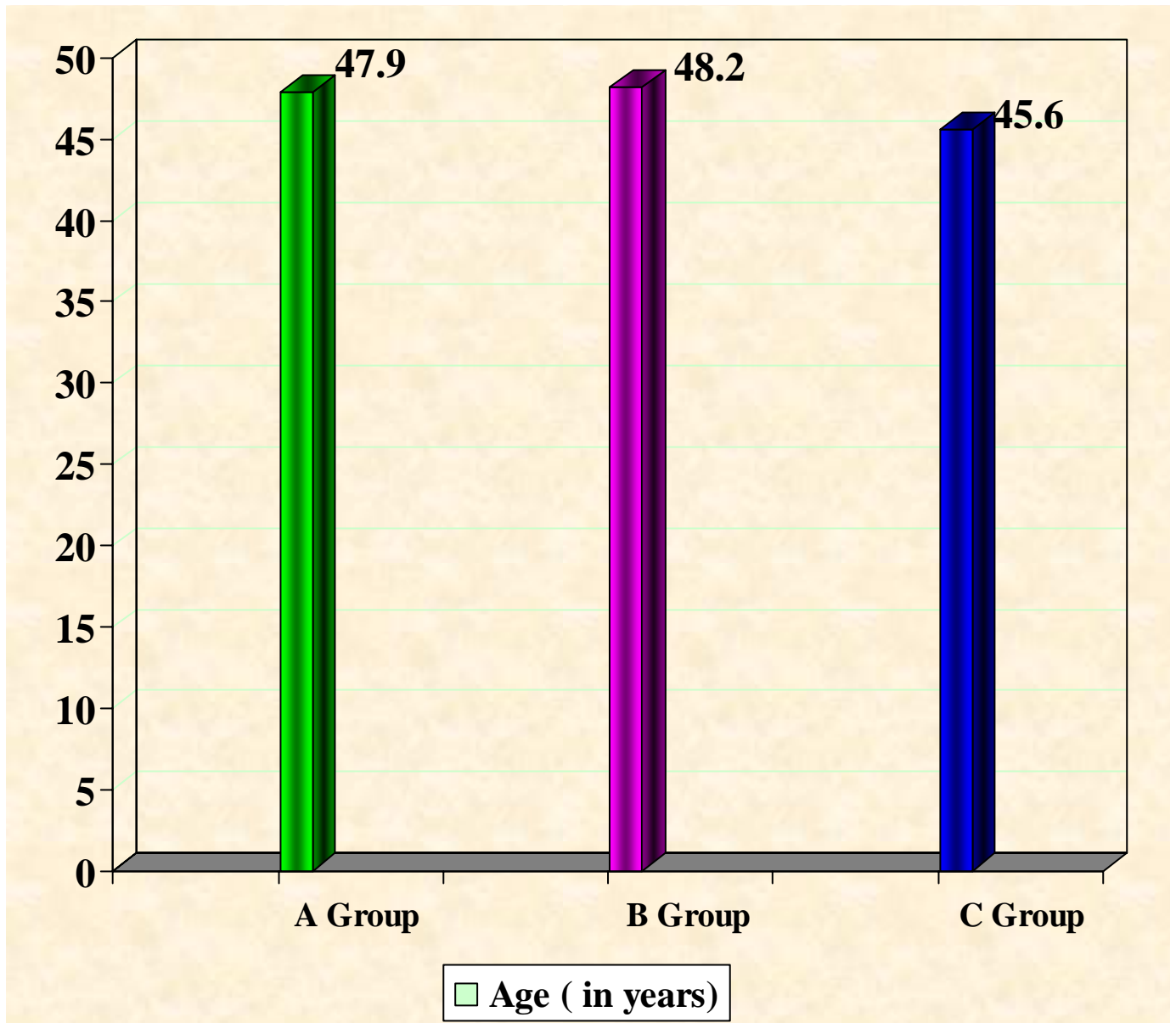


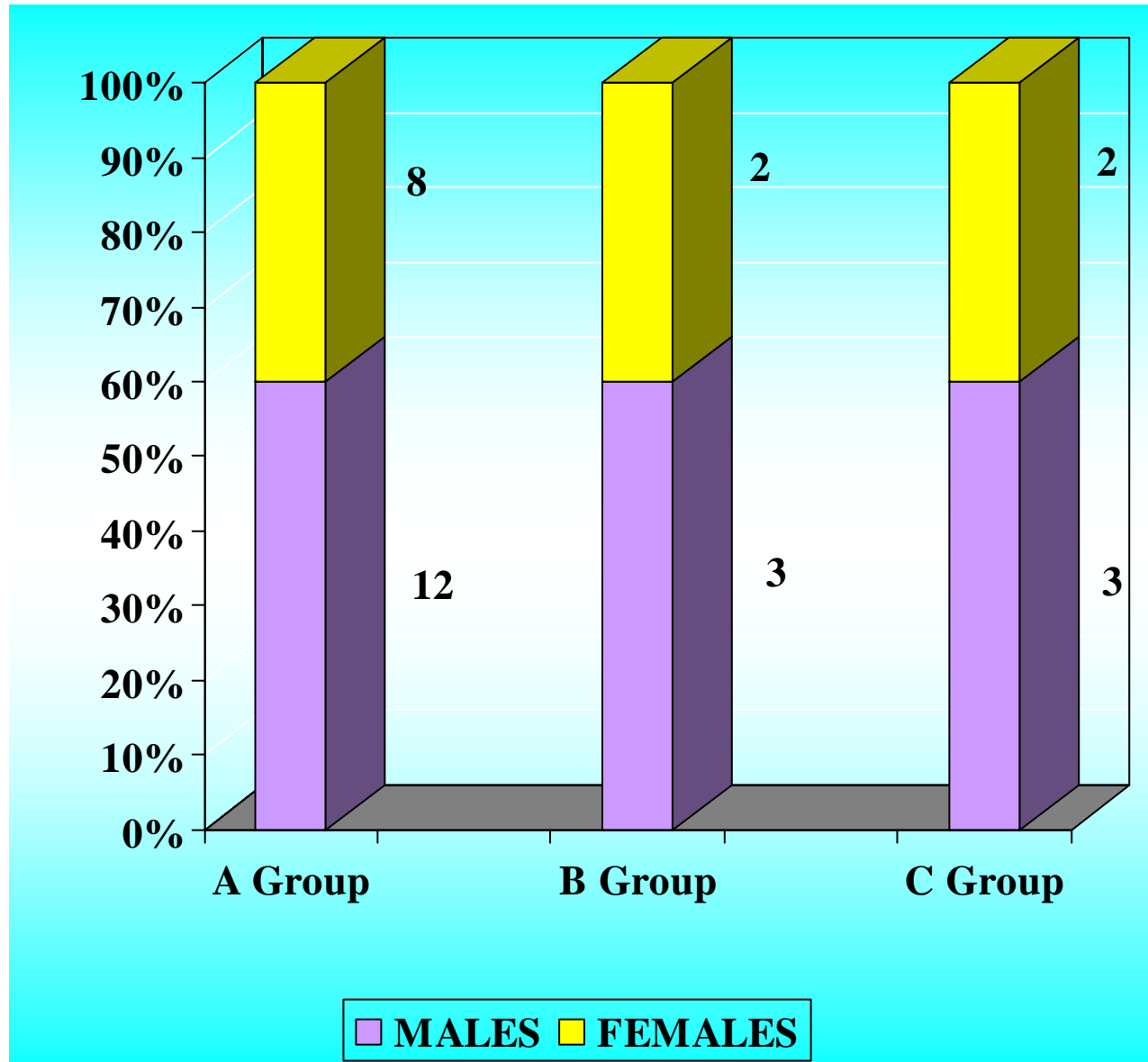
Table 2 : Sex Distribution

Sex	Group A		Group B		Group C	
	No	%	No	%	No	%
Male	12	60	3	60	3	60
Female	8	40	2	40	2	40

The sex composition of the patient studied is identical in all three groups.

Since there is no statistically different in the age and sex composition of the three groups, the results obtained in this study for finding the efficacy of the three regimens is valid.

SEX DISTRIBUTION



B : EFFICACY OF THE THREE REGIMEN

Table 3 : Visual Analysis Scale

Groups	Visual Analog Scale		
	Before Treatment (Mean \pm SD)	After Treatment (Mean \pm SD)	Change (Mean \pm SD)
A	7.95 \pm 0.6	2.65 \pm 0.81	5.3 \pm 0.73
B	7.8 \pm 0.45	4.4 \pm 0.55	3.4 \pm 0.55
C	7.6 \pm 0.55	4.6 \pm 0.55	3 \pm 0
‘p’	0.4681 Not Significant	0.0001 Significant	0.0001 Significant

The decrease in VAS of the patients given cervical tract is maximum in Group A (5.3 \pm 0.73) followed by points in group B and C (3.4 \pm 0.5) (3 \pm 0)

The difference change is statistically significant (0.0001)

CHANGE IN VISUAL ANALOG SCALE

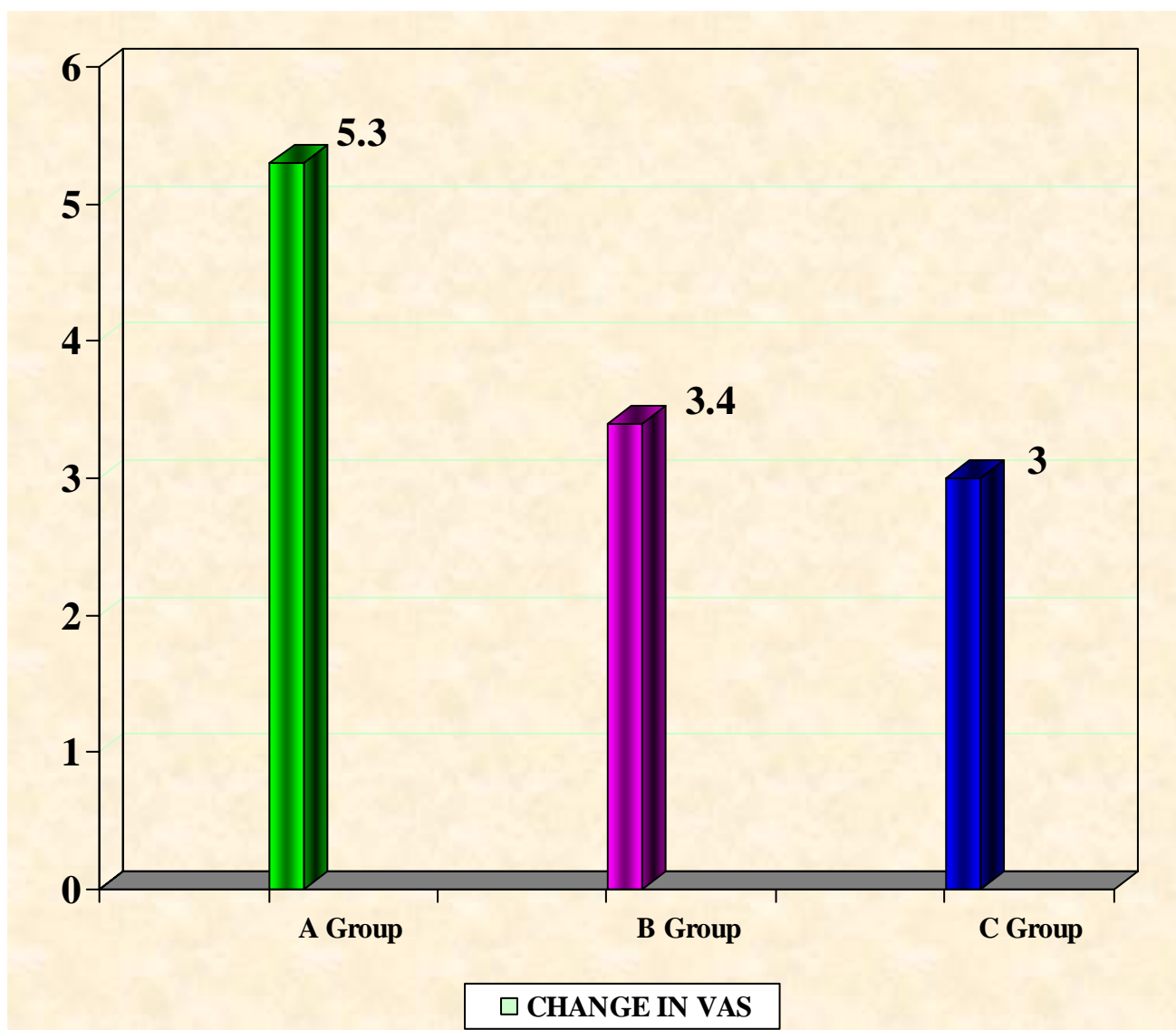


Table 4 : Presence of radiation in right side

Group	Presence of radiation in right side			
	Before treatment		After treatment	
	No	%	No	%
A	4	20	-	-
B	1	20	1	20
C	1	20	1	20

There was presence of radiation to right side in 4 patients, in Group A, 1 in B and 1 in C. The radiation was absent in all those 4 case where C.traction was used but it remained the same in group B and C.

**PRESENCE OF RADIATION
IN RIGHT SIDE**

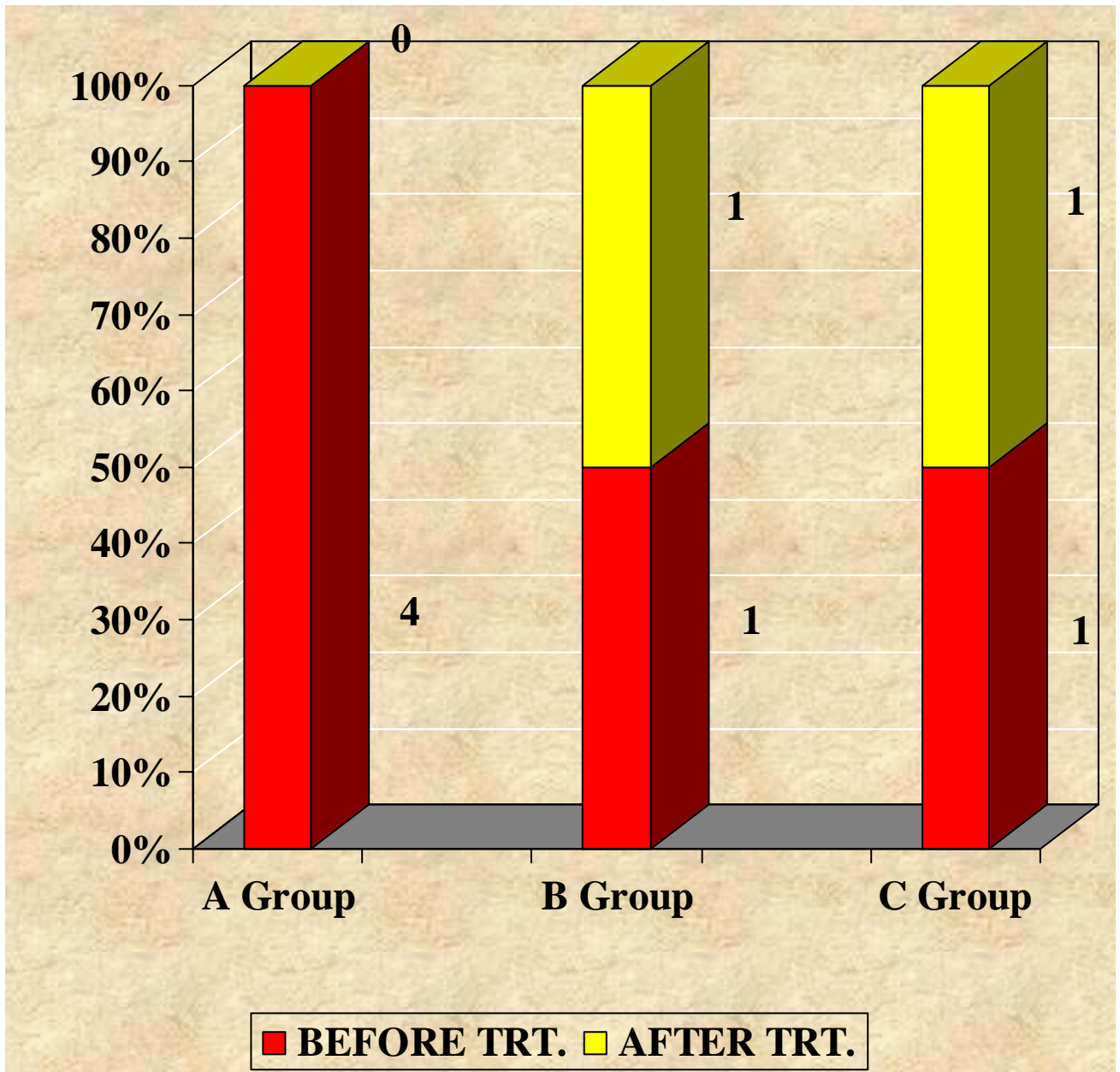


Table 5 : Presence of radiation in left side

Group	Presence of radiation in left side			
	Before treatment		After treatment	
	No	%	No	%
A	3	15	-	-
B	-	-	-	-
C	-	-	-	-

There was presence of radiation in 3 left side before C.traction. In the Study group after C.traction there is no radiation. In control group there was no left side radiation.

Table 6 : Flexion

Group	Flexion in degrees (Mean \pm S.D)		
	Before treatment	After treatment	Difference
A	47.5 \pm 14.1	57.5 \pm 4.4	10 \pm 4.7
B	42 \pm 8.4	50 \pm 7.1	8 \pm 4.5
C	42 \pm 8.4	46 \pm 5.5	4 \pm 5.5
p	0.4432 Not significant	0.0012 significant	0.0007 Significant

The improvement in Flexion in degrees given cervical traction is maximum (10 \pm 4.7) in group A followed by patients in group B and C (8 \pm 4.5) (4 \pm 5.5)

The difference is statistically significant (0.0012), (0.0007)

CHANGE IN FLEXION

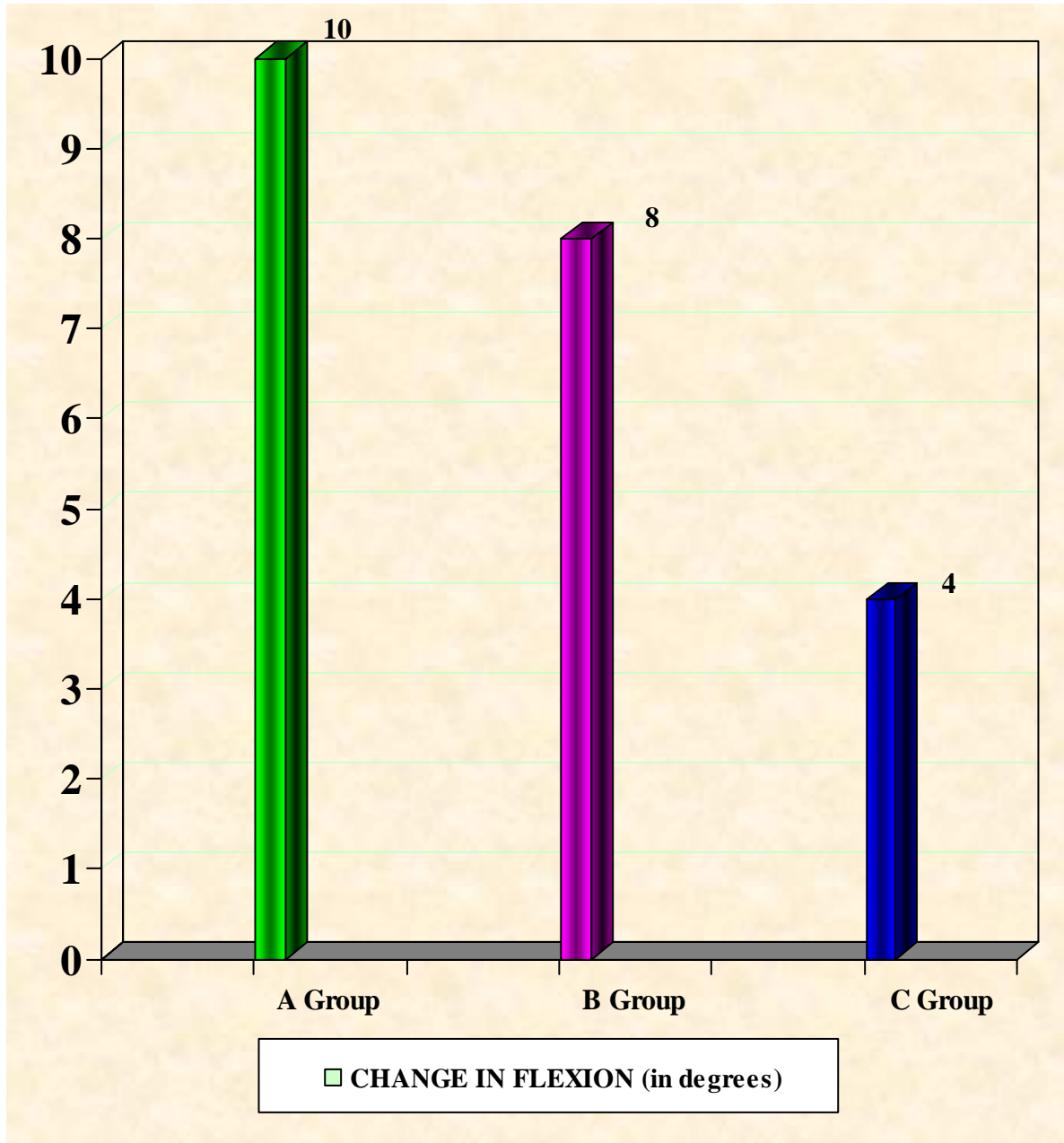


Table 7 : Side Radiation in Right Side

Group	Side Radiation in Right Side in degrees (Mean \pm S.D)		
	Before treatment	After treatment	Difference
A	52 \pm 12.8	77 \pm 4.7	25 \pm 11.9
B	52 \pm 13.0	64 \pm 8.9	12 \pm 4.5
C	62 \pm 11.0	66 \pm 11.4	4 \pm 5.5
p	0.2068 Not significant	0.002 Significant	0.0019 Significant

The improvement in side rotation in right side in degrees given C.traction is maximum (25 \pm 11.9) in group A followed by patients in group B and C (12 \pm 4.5) (4 \pm 5.5)

The difference is statistically significant (0.002), (0.0019)

**CHANGE IN SIDE ROTATION
IN RIGHT SIDE**

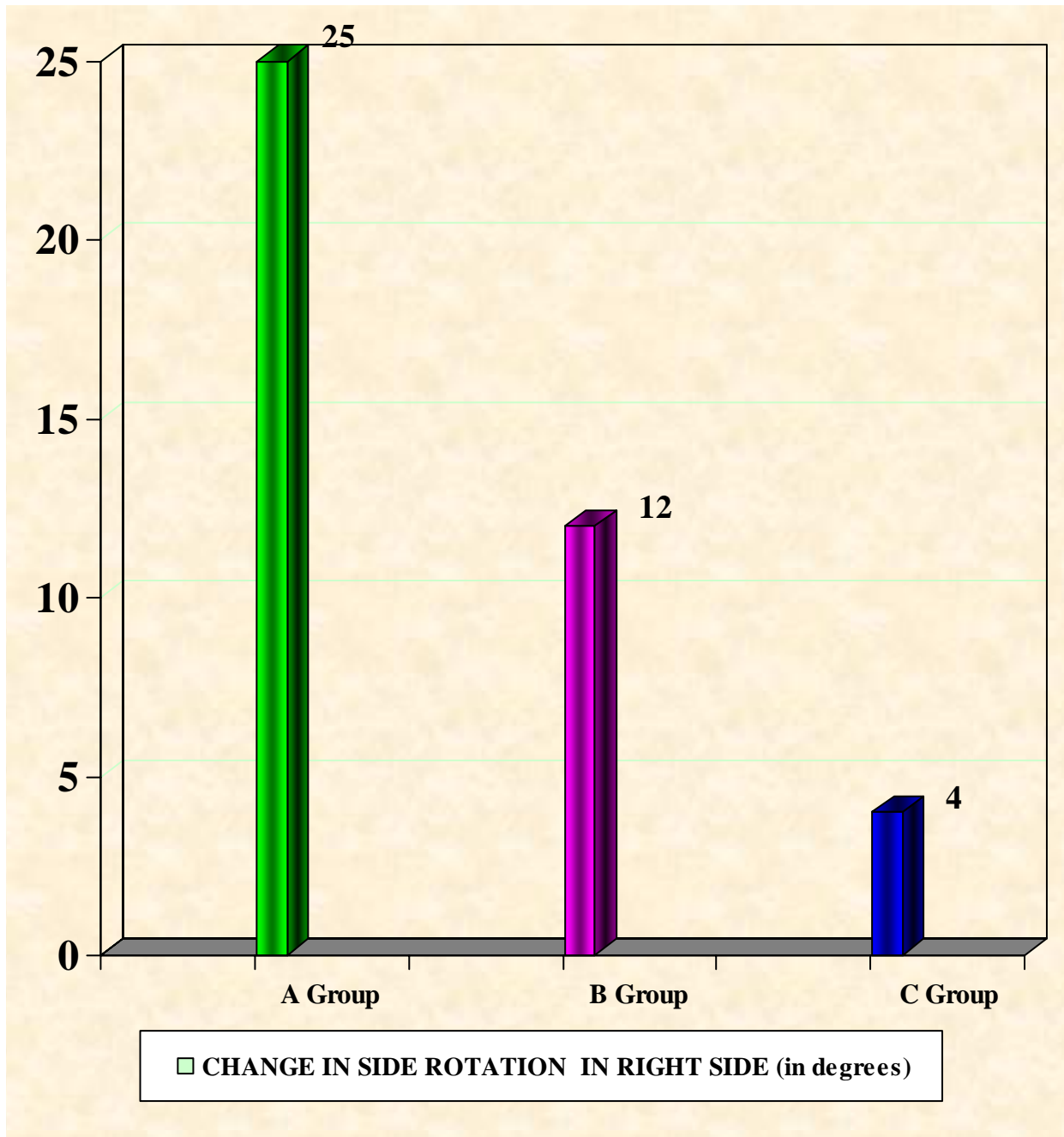


Table 8 : Side rotation in left side

Group	Side rotation in left side in degrees (Mean \pm S.D)		
	Before treatment	After treatment	Difference
A	55 \pm 18.8	76.5 \pm 4.9	21.5 \pm 16.9
B	66 \pm 13.4	72 \pm 8.4	6 \pm 5.5
C	66 \pm 8.9	72 \pm 8.4	6 \pm 8.9
p	0.2679 Not significant	0.2758 Not significant	0.0405 Significant

The improvement in side rotation in left side in degrees given C.traction is maximum (21.5 \pm 16.9) in group A followed by patients in group B and C (6 \pm 5.5), (6 \pm 8.9)

CHANGE IN SIDE ROTATION IN LEFT SIDE

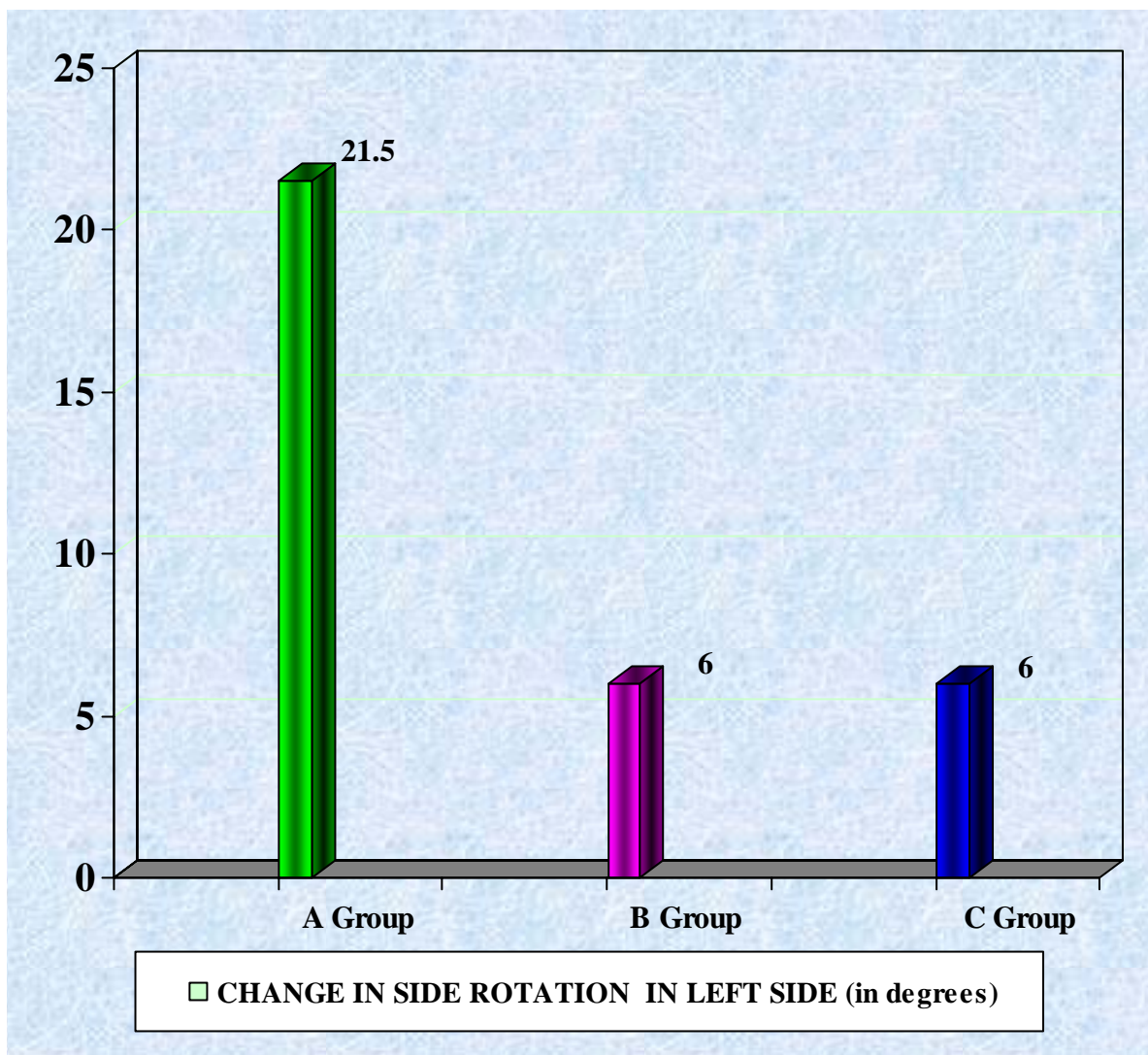


Table 9 : Lateral flexion in right side

Group	Lateral flexion in right side in degrees (Mean \pm S.D)		
	Before treatment	After treatment	Difference
A	28 \pm 7.0	42.5 \pm 2.6	14.5 \pm 6.3
B	32 \pm 4.5	38 \pm 4.5	6 \pm 5.5
C	36 \pm 5.5	38 \pm 4.5	2 \pm 4.5
p	0.055 Not significant	0.0095 significant	0.0016 significant

The improvement in lateral flexion in right side in degrees given C.traction is significant (14.5 \pm 6.3) in group A followed by patients in group B and C (6 \pm 5.5), (2 \pm 4.5)

The difference is statistically significant (0.0095), (0.0016)

CHANGE IN LATERAL FLEXION IN RIGHT SIDE

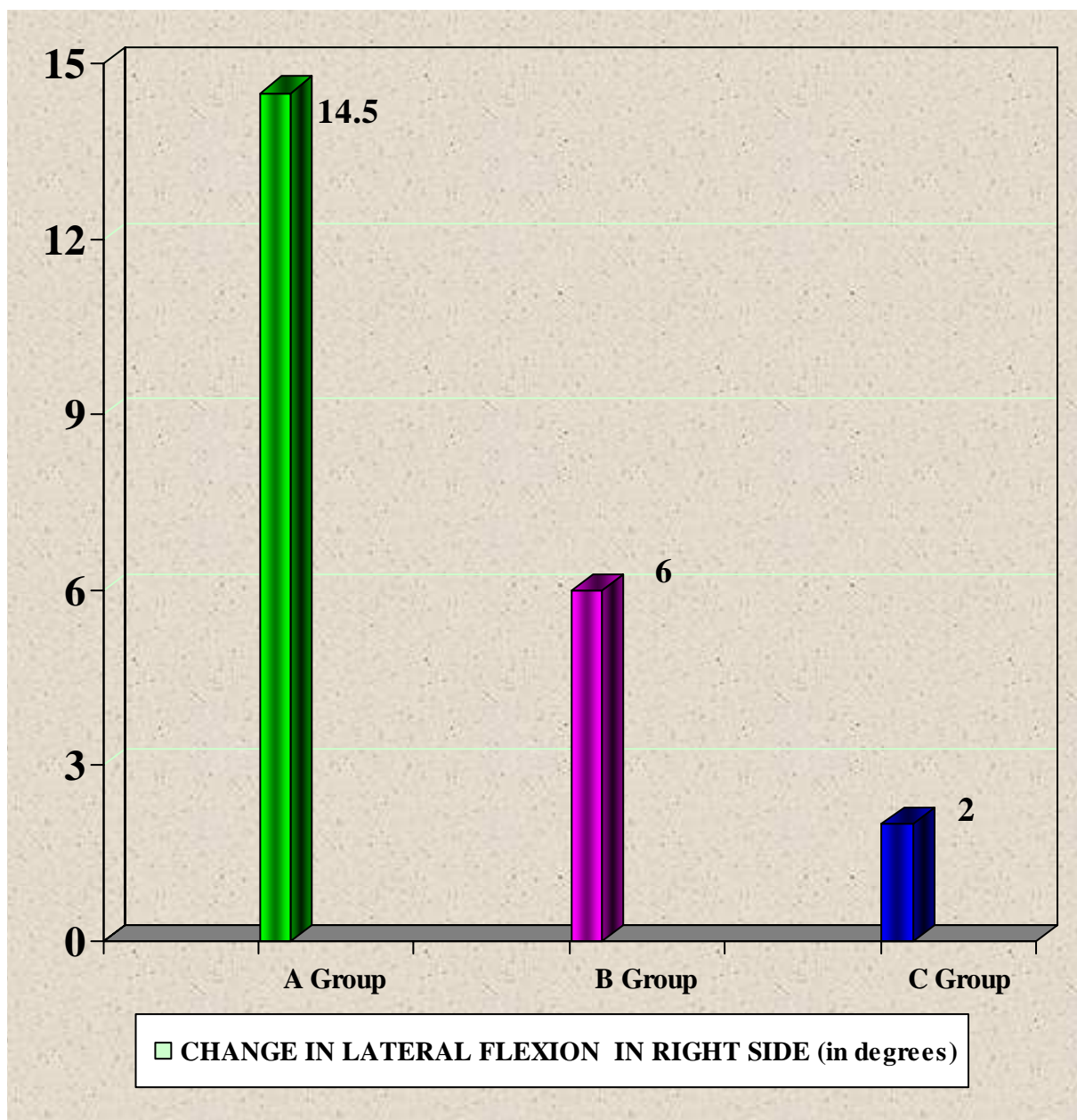


Table 10 : Lateral flexion in left side

Group	Lateral flexion in left side in degrees (Mean \pm S.D)		
	Before treatment	After treatment	Difference
A	30 \pm 5.6	42.3 \pm 2.6	12.3 \pm 5.3
B	36 \pm 5.5	38 \pm 4.5	2 \pm 4.5
C	34 \pm 5.5	36 \pm 5.5	2 \pm 4.5
p	0.0768 Not significant	0.0072 Significant	0.0005 significant

The improvement in lateral flexion in left side in degrees given C.traction is significant (12.3 \pm 5.3) in group A followed by patients in group B and C (2 \pm 4.5), (2 \pm 4.5)

The difference is statistically significant (0.0072), (0.0005)

CHANGE IN LATERAL FLEXION IN LEFT SIDE

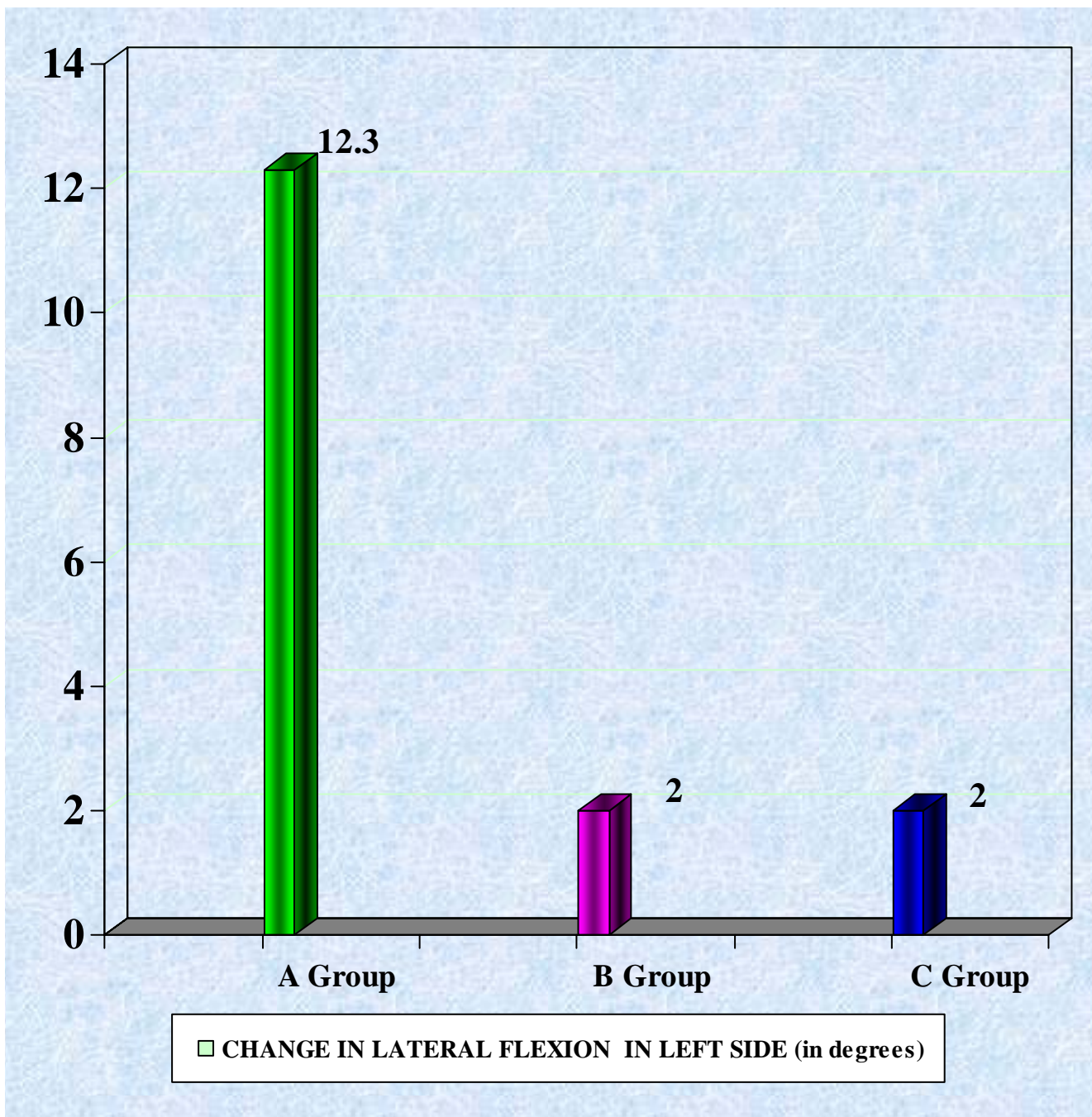
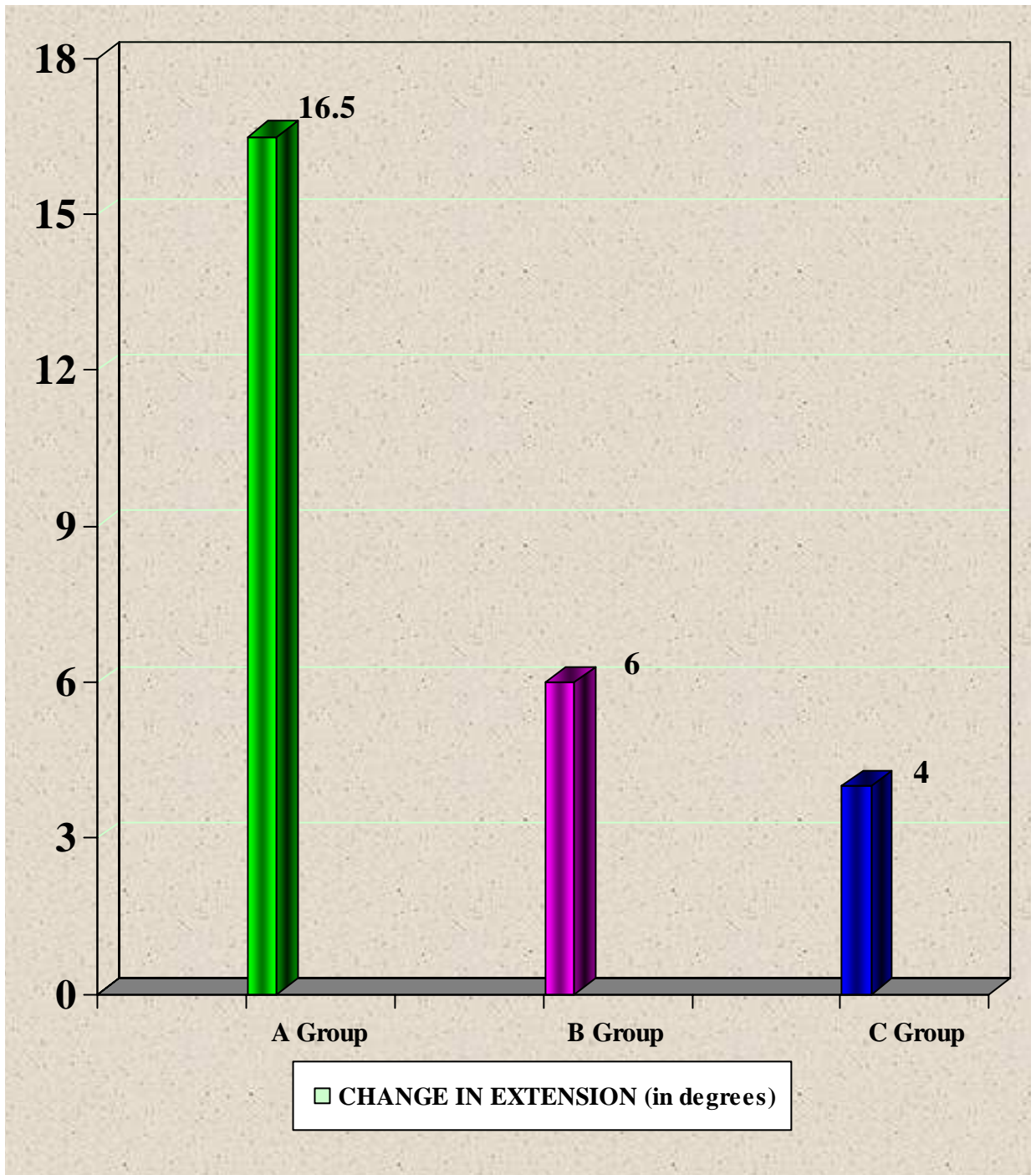


Table 12 : Extention

Group	Extension in degrees (Mean \pm S.D)		
	Before treatment	After treatment	Difference
A	44.5 \pm 9.4	61 \pm 7.2	16.5 \pm 10.4
B	48 \pm 13.0	54 \pm 8.9	6 \pm 5.5
C	50 \pm 10	54 \pm 5.5	4 \pm 5.5
p	0.5595 Not significant	0.0562 Not significant	0.016 Significant

The improvement in Extension in degrees given C.traction is significant (16.5 \pm 10.4) in group A followed by B and C (6 \pm 5.5), (4 \pm 5.5)

CHANGE IN EXTENSION



Discussion

Discussion

Cervical Spondylosis manifest as various symptoms such as neck pain, range of movement affection, radiating pain, sensory, motor deficit and long tract signs, is treated with several medical and physical modalities. In the present study we investigated the prognosis of cervical spondylosis following use of cervical traction as a physical modality in Indian patients (using VAS and ROM as measurements)

Age

The age groups of patients in the study were in the age group of 30 to 60 years. The age distribution was equal among the three groups with no statistically significant difference ($p=0.7154$)

Of the 30 patients the incidence shows increase with age

Sex

There were 18 male and 12 female patients in the study. In our study since there is no statistically different in Age and sex composition of the three groups. The results obtained in this study for finding the efficacy of the three regimen is valid.

VAS

In our study VAS were Mean \pm SD 7.95 ± 0.6 in Group I, 7.8 ± 0.45 in Group II and 7.6 ± 0.55 in Group III. The pain measurement using subjective Visual Analog Scale (VAS) is not statistically significant before treatment. But after cervical traction the value of VAS in Pain measurement and change obtained are statistically significant (0.0001) proves the effectiveness of traction in pain reduction comparing the control group.

Pain Radiation

In the study group there were 7 patients with radiation of pain. There were 4 patients with right side radiation, representing 20% of the study group.

There were 3 patients with left side radiation, representing 15% of the study group. In control group 3 patients with right side pain radiation representing 20% of the control group.

After cervical traction 0% radiation in study group in the right and left side and persistence of radiation 20% in control group, proves the effectiveness of traction in relieving pain radiation.

Range of Movement

In the study group there was range of movement restricted to various degrees before cervical traction and after cervical traction, range of movement increase.

In Flexion difference is statistically significant P value is 0.0007

In Right side rotation difference is statistically significant P value is 0.0019

In Left side rotation difference is statistically significant P value is 0.0405

In Lateral Flexion in Right side difference is statistically significant P value is 0.0016

In Lateral Flexion in Left side difference is statistically significant P value is 0.0005

In Extension the difference is statistically significant P value 0.0160

Shows improvement in all range of movement of neck following use of cervical traction as physical modality.

Limitation of the Study

The subjects selected for the group study did not have sensory or motor reflex deficit. This could be a limitation of our study.

The cervical traction used in this study is intermittent cervical traction in supine lying position. The other types like continuous traction in supine lying and sitting traction is not employed to find out the effectiveness of improvement.

More number of cases in the same study may be a effective measure.

Conclusion

Conclusion

- The prevalence of cervical spondylosis increase with age
- Our study indicate effective cervical traction bringing out improvement in pain measured by visual analog scale (VAS), relief in radiation of pain to the hand by its disappearance and range of movement improvement.
- Our study indicates including cervical traction as a physical modality suggests a high improvement in a less time than without using it in patients suffering from cervical spondylosis.

Summary

Summary

Cervical spondylosis is a common neck problem affecting humans after 30 years of age.

The study was conducted to find out the effectiveness of cervical tractions as a physical modality.

After an informed consent and with rigid inclusion and exclusion criteria, 20 patients and 10 controls were selected carefully and were evaluated on social, clinical and laboratory aspects. The data were entered in Microsoft Excel spreadsheet and analyzed statistically.

The Mean age was 47.9 ± 5.9 of the 20 patients, with cervical spondylosis were given (cervical traction) as a physical modality. The age groups of all the three groups were comparable and there was no statistical significant ($p = 0.7154$).

There were 18 male and 12 female patients in the study, the people affected with cervical spondylosis, no statistically difference between male and females studied in all the three group.

There was statistically significant improvement in pain relief measured by VAS. Reduction of radiation of pain into the upper limb and improvement of range of movement of the neck with the cervical traction in the patients suffering from cervical spondylosis.

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Annexure I

Case Proforma

Age :

Sex :

OP.No. :

Vocation :

Place :

Complaints :

H/O Present Illness :

H/O Past Illness :

Vocational History :

General Examination :

Physical Examination

Range of Movement of Neck in (Active + Passive) together

1. Flexion
2. Extension
3. Side Rotation RT
4. Side Rotation LT
5. Lateral Flexion RT
6. Lateral Flexion LT

Neurological Examination

Muscle Tone

Sensory System

Motor-Power

Reflexes	Deep
	Superficial

VAS

Investigations

Urine	Albumin
	Sugar
	Deposit

Hb %

Blood	TC
	DC
	ESR
	C-reactive protein

X-ray	C-spine	Antero posterior
	Views	Lateral
		Oblique

Annexure II

Key to Master Chart

- | | | | |
|----|---|------------------|----------|
| 1. | Group A | Group B | Group C |
| | patients given Cervical traction
with NSAIDS & Hotpack | NSAIDS & Hotpack | NSAIDS |
| 2. | Sex | M-Male | F-Female |
| 3. | VAS – Visual Analog Scale | | |

MASTER CHART

No	Group	Age	Sex	Before traction									After traction								
				VAS	Radiation		Flexion (in degrees)	Side rotation (in degrees)		Lateral flexion (in degrees)		Extension (in degrees)	VAS	Radiation		Flexion (in degrees)	Side rotation (in degrees)		Lateral flexion (in degrees)		Extension (in degrees)
					Right	Left		Right	Left	Right	Left			Right	Left		Right	Left	Right	Left	
1	A	50	M	8	No	No	40	60	60	20	20	50	2	No	No	60	80	80	40	40	70
2	A	45	F	9	Yes	No	30	40	40	30	30	50	4	No	No	50	70	70	40	40	60
3	A	40	F	8	No	Yes	60	40	80	30	30	50	3	No	No	60	80	80	45	45	60
4	A	51	M	8	No	No	60	50	50	20	30	40	3	No	No	60	80	80	40	45	60
5	A	55	M	8	No	No	60	40	30	20	20	40	3	No	No	60	80	80	40	40	60
6	A	50	F	8	No	Yes	60	60	20	30	30	30	3	No	No	60	80	70	40	45	60
7	A	43	F	7	No	No	30	60	60	30	30	40	2	No	No	50	80	70	45	40	60
8	A	41	M	8	Yes	No	40	50	60	30	40	50	1	No	No	60	80	80	45	45	70
9	A	42	F	9	Yes	No	30	50	40	40	40	50	3	No	No	50	80	80	45	45	50
10	A	43	M	7	No	Yes	40	30	50	20	30	40	3	No	No	50	70	70	40	40	70
11	A	60	M	8	No	No	50	60	80	30	30	50	3	No	No	60	70	80	40	40	50
12	A	54	M	8	No	No	60	50	60	40	30	50	3	No	No	60	80	80	45	40	50
13	A	56	M	9	No	No	60	40	60	20	30	40	4	No	No	60	70	80	40	40	50
14	A	45	F	7	No	No	60	40	80	40	30	50	1	No	No	60	80	80	45	40	70

No	Group	Age	Sex	Before traction									After traction								
				VAS	Radiation		Flexion (in degrees)	Side rotation (in degrees)		Lateral flexion (in degrees)		Extension (in degrees)	VAS	Radiation		Flexion (in degrees)	Side rotation (in degrees)		Lateral flexion (in degrees)		Extension (in degrees)
					Right	Left		Right	Left	Right	Left			Right	Left		Right	Left	Right	Left	
15	A	50	M	8	Yes	No	30	60	80	20	20	30	3	No	No	50	80	80	45	45	60
16	A	46	M	8	No	No	20	50	40	30	30	30	2	No	No	60	80	70	45	45	60
17	A	47	F	8	No	No	60	50	60	20	30	40	3	No	No	60	70	70	45	45	60
18	A	38	M	7	No	No	60	50	80	30	30	70	3	No	No	60	70	80	40	40	70
19	A	50	F	8	No	No	40	80	30	30	30	50	2	No	No	60	80	70	40	40	70
20	A	52	M	8	No	No	60	80	40	30	40	40	2	No	No	60	80	80	45	45	60
21	B	50	M	8	No	No	40	60	80	30	30	40	5	No	No	50	70	80	40	40	50
22	B	47	F	8	No	No	30	50	50	40	30	40	5	No	No	40	60	60	40	30	50
23	B	56	M	7	Yes	No	40	30	80	30	40	50	4	Yes	No	50	50	80	40	40	50
24	B	49	M	8	No	No	50	60	60	30	40	70	4	No	No	60	70	70	40	40	70
25	B	39	F	8	No	No	50	60	60	30	40	40	4	No	No	50	70	70	30	40	50
26	C	46	M	8	No	No	40	60	80	30	30	40	5	No	No	50	70	80	30	40	50
27	C	49	M	8	No	No	50	50	60	40	30	50	5	No	No	50	50	60	40	30	50
28	C	52	F	7	Yes	No	30	80	60	40	40	40	4	Yes	No	40	80	70	40	40	50
29	C	38	F	7	No	No	40	60	70	30	30	60	4	No	No	40	60	70	40	30	60
30	C	43	M	8	No	No	50	60	60	40	40	60	5	No	No	50	70	80	40	40	60

